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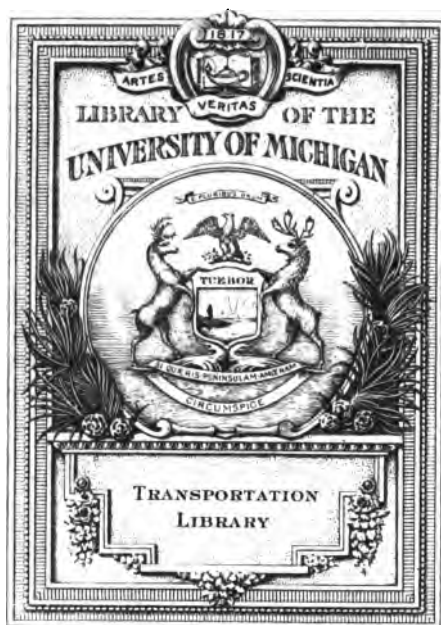
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REPORT

OF THE

RAILWAY COMMITTEE.

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**EXTRACT FROM PROCEEDINGS OF THE MADRAS
RAILWAY COMMITTEE, AT A MEETING HELD
ON THE 10TH APRIL, 1850.**

Resolved, That a Public Meeting of the Inhabitants of Madras be called for Saturday the 4th Proximo, at 11 o'clock.

Resolved, That the Report now read, be adopted as the Report to be presented to the Public Meeting.

red Lockley
11-29-38
Transport.

4-29-49 J.W.

REPORT.

YOUR Committee were appointed at a General Meeting of the inhabitants of Madras, on the 29th May 1849, to enter into communication with the Honorable Court of Directors, relative to the construction of a Railway from Madras into the interior, in a Westerly direction, and to press upon the Court the title of Madras to the same consideration shown for Bengal and Bombay lines, in the guaranteed return of five per cent. premium on capital,—and further to take measures for putting forward a scheme of a Joint Stock Railway Company.

The immediate duties thus thrown upon your Committee, were speedily rendered supererogatory by the revival in London—at a period simultaneous with the nomination of your Committee—of the old Madras Railway Company, which contemplated a line extending as far Westward as Wallajah-nuggur. It appeared to your Committee, that such a Company was calculated to meet exactly all that was sought for and desired by the public of Madras; and they therefore determined at once, to lend all the aid in their power to the Provisional Board at Home, which was engaged in measures for promoting its establishment. Accordingly, they gave notice of such resolution to the temporary Chairman, Colonel Sim, on the 16th June last, and proceeded to engage in such works on this side, as seemed the best calculated to afford practical aid in completing speedily the scheme of the London Company. Of this nature were—a regular survey of a line to Poonamallee; the collection of the best available information as to cost of construction in all those

points connected with a Railway where the same would fall to be executed in this country; the procuring a series of levels along the whole line to Wallajahnuggur; and an invitation to the public to register their names as Shareholders in the contemplated undertaking.

The last of these proceedings has not been attended with any beneficial result, owing obviously to the unwillingness of parties to bind themselves to any amount of subscription until the scheme of the Railway Company shall become a definite and determined one. But the former objects have been successfully realized; and a valuable mass of information, with plans and sections, has been furnished to your Committee by Captain Collyer of the Engineers, which will prove of eminent service to the Home Board, in satisfying them as to the nature of the country that has to be traversed by their line, and in enabling them to verify all their calculations of the probable cost of the work. Captain Collyer's very able report on the various topics will be found in the Appendix, and your Committee desire to take this opportunity, of expressing their high sense of Captain Collyer's persevering zeal and unwearied exertions in furthering the important cause which they have in hand, and of the great obligation under which they and the public of Madras rest towards him, for the extensive and valuable fruits of his labours.

In communicating with the Home Committee, your Committee deemed it necessary to express their opinion, that a *single* line of rails was all that required to be laid down in the first instance,—further, that it was desirable in the interests of the Company, that the services of Professional Engineers of the Madras service should be taken advantage of in the construction of the work, and also that, when completed, the supervision of the working of the Railway should be placed with a local Board. They cannot doubt that all these points will be conceded when the scheme comes to be carried out.

Since the period of their first communication in May last, the gentlemen of the Home Provisional Committee, have

been engaged in strenuous and unflagging efforts to obtain the extension, by the East India Company, of the guarantee of five per cent., which had already been accorded to the Railways of Bengal and Bombay; but your Committee regret to say, that these efforts have hitherto failed of success. The letters in the Appendix will explain this untoward result. There remains however great cause for hope, and for renewed exertion, in the consideration that the Court of Directors is understood to be favourably inclined to the concession of the guarantee, and that the opposition of the Board of Control is what has alone to be overcome. To break down this last named barrier is now the endeavour of the Home Committee, and the following very able and powerful appeal, setting forth all the peculiar claims and merits of a Madras Railway, is being addressed to the Authorities, in the hope of its causing a reconsideration of the former resolve, and an ultimate grant of the guarantee of a five per cent. dividend.

2 WINCHESTER BUILDINGS,
LONDON, 20th February.

TO THE CHAIRMAN, DEPUTY CHAIRMAN,
AND COURT OF DIRECTORS OF THE
HONORABLE EAST INDIA COMPANY.

HONORABLE SIRS—We received with deep disappointment the unfavourable answer to our application for the admission of the Madras Railway to the same advantages of guaranteed interest on its capital, as have been granted to those of Bengal and Bombay, your Honorable Court informing us that no further pecuniary support to undertakings of this nature can be granted, till the result of the experiments already sanctioned is ascertained.

Relying too entirely, we fear, on your Honorable Court's recognition of the merits and claims of the Madras Line, backed as they were by the unprecedented support of the whole Madras Community, we did not enter, in our former letters, into the details which a full exposition of those claims

requires. But if we may now be allowed to do so, we are confident of establishing so clearly the inexpediency of delaying the execution of this Line for the object assigned, the manifold advantages of its early construction, and the merely nominal nature of the support in a pecuniary point of view, which the guarantee of five per cent. on its capital would entail, that your Honorable Court, we trust, will see strong grounds for reviewing the former decision, and for not postponing the extension to the Madras Railway of the same measure of support as has been given to the others.

We beg leave in the first place to submit, that the two sections of Lines already sanctioned in Bengal and Bombay can only be taken as experiments so far as regards the cost of construction in their respective localities. No expectation is entertained, we believe, that in their isolated and fragmentary state they will either pay, or can afford any criterion of the value of railways in India generally as a commercial speculation, or of their public utility. It does not appear therefore in what way the result of those experiments, whatever it be, can bear on a line of entirely opposite character in the Madras Presidency, or why the introduction of railways there should be postponed on their account.

The great object, as it seems to us, to be held in view in selecting a line for determining experimentally the advantages of the introduction of railway communication into India, is to find one of moderate length, having well established termini between which there already exists considerable traffic, running over a country that presents no considerable engineering difficulties, to be constructed therefore at a moderate cost, and with a fair prospect of paying well. To this important result the absence of competing water-carriage must greatly conduce. If to the foregoing conditions the Line adds that of being fitted for eventual prolongation, so as to form one of the great arterial trunk Lines of the country, it must be admitted to combine all the elements necessary for determining the question most satisfactorily and advantageously.

Now, without inquiring how many of those requisites besides the last, the lines already sanctioned possess, we are

prepared to prove that the Line from Madras to Wallajah-nuggur, for which we solicit the support of your Honorable Court, possesses every one of them.

This Line is seventy-two miles in length. It starts from Madras, the seat of Government, and the chief, or rather, sole port of Southern India, containing with its suburbs a population of 600,000 souls; and it ends at Wallajahnuggur or Arcot, the latter a considerable military station, and the former a populous town which is already the great "entrepot of the traffic" between the Presidency and the Western Provinces. For its accommodation, and for the transport more especially of salt from the coast to the interior, the Madras Government proposed more than ten years ago to construct a railway, in supercession of the common road which at present connects the two places, and is maintained at a very heavy cost to Government, in a very imperfect condition, owing to the want of good materials. The surveys then made by the Government Engineers established the fact that the Line presented no engineering difficulties whatever, but on the contrary, offered every facility for cheap and easy construction from the dry and level character of the country; while it did not cross a single river or stream of any magnitude. And these results have been fully confirmed by two subsequent surveys made by other scientific Officers. These and still more recent investigations have proved beyond all reasonable doubt, that while the cost of constructing the Line would be very moderate indeed, the amount of traffic, both in goods and passengers, would be such as to pay a very handsome profit on the outlay.

It can hardly be necessary to remark that there is no competing water-carriage whatever, nor ever can be. Until a railway is made, the whole intercourse between the coast and the interior of the South of India must continue to be carried on by the very imperfect, tedious, and costly modes of land conveyance at present in use.

With respect to the last point named, as desirable in the Line selected for experimental construction, viz., its fitness to serve as a main trunk Line, and to be ultimately prolonged

into one of the great arterial Lines of the empire, we proceed to prove that our proposed Railway possesses this requisite also in an eminent degree. A glance at the Map will show that however future Lines may radiate from Wal-lajahnuggur, the traffic between Madras and nearly the whole of its inland territory would always flow along the Line up to that point.

But this Section, though complete in itself, is only in fact the first of a Line to be carried eventually across the Peninsula; which, opening up the rich and fertile districts of the Cauvery, of Tanjore, Trichinopoly, and Coimbatore, would unite the two Coasts of Malabar and Coromandel. For this great undertaking, nature has made a remarkable provision by the opening left at Paulghaut in the otherwise continuous line of the great range of Western Ghauts. It would be superfluous to enlarge on the political and commercial importance of a Line like this, abutting at one end on the Western, and at the other on the Eastern Coast of the Peninsula. While it would shorten the communication materially between London and Calcutta, as well as between the two sides of the Peninsula, it would afford, with its branches, the means of cheap and rapid transit to either Coast for the valuable produce of the Great Cotton districts of the South of India, and thus secure for it uninterrupted means of shipment throughout the year, which it does not at present enjoy, the N. E. and S. W. Monsoons shutting alternately the Coromandel and Malabar Ports.

Having thus demonstrated the singular recommendations which this Line possesses for adoption beyond any other that has yet been projected in India, we desire next to draw attention to the peculiar claims which Madras has, as a Presidency, for her share at least of any encouragement that is to be given to the introduction of Railway Communication within our Indian dominions. She is in the first place devoid, it may be said, of inland water-carriage, which Bengal enjoys to so great extent, and of those facilities of communication by Sea possessed by the Bombay territories, while her population appears to be more highly taxed than

that of either. The population of the Bengal Provinces is at least 30 millions, the revenue raised from them, exclusive of Opium (which they do not pay), is $6\frac{1}{2}$ millions Sterling, or 4s. 4d. per head. The population of the Madras Provinces is 13 millions, and the revenue $4\frac{1}{2}$ millions Sterling, or 6s. 4d. per head. This enormous disproportion in taxation is a strong reason in itself for affording to the people of Madras every aid to support it, and nothing can do this so effectually as cheapening the cost of transit of their produce by the introduction of Railways.

Connected with this important point of revenue, is another reason peculiarly applying to Madras: while in Bengal the Government, having no rights of revenue in the waste lands, can gain nothing directly by the extension of cultivation, in the Madras Presidency every additional acre that may be brought into cultivation by the stimulus which Railway Transit affords, will bring with it a corresponding increase to the public treasury, because there the Government have rights of revenue in all waste land brought under cultivation.

Again, in the important article of Salt, which in the other Presidencies is cheaply though slowly conveyed by water-carriage, the price to the consumers at some of the stations of the Madras Presidency is actually sextupled by the enormous expense of the land carriage. The Government, as the monopolist of the supply of Salt, has as deep an interest in diminishing the cost of transport as the people, and it was for its own financial advantage, as well as for the benefit of the people, that the Madras line, as we have stated, was originally projected. It was then calculated that from the increased consumption of Salt alone, under a reduced tariff, it would be worth the while of Government to construct the line.

We may here advert to another very important object to be attained by the execution of the Madras Railway, the development of the Mineral resources of Southern India, by the employment of Native Iron in its construction. We have reason to believe that parties engaged in the manufacture would contract to deliver this Iron at prices not higher than those of English Iron, on the spot; while its quality is so

superior, that it has been proposed to use it in this country for veneering the common Iron rails, to increase their durability.

The political importance of the Line may perhaps have been, to some extent, under-rated, from an idea that as the Madras Army is by its position removed from the probable scene of important warfare, it is of less consequence to facilitate the transport of the Troops, Stores, &c. of that Presidency. But it must be evident that no movement of the other armies to the N. W. Frontiers can ever take place, that is not attended with a corresponding move of the Madras Army to supply the stations vacated by the others. So that supposing, for instance, the Line to be finished from Calcutta to Delhi, it would still be as a Military work incomplete, without the corresponding facilities for moving up the Troops from Madras.

But in addition to this, and the vast advantages in a political, economical, and strategical point of view to be derived from any Railway in India, there are others attaching particularly to the Madras Line which deserve attention.

It is to the Army of this Presidency that we must henceforth chiefly look for service beyond sea; and the geographical position of its provinces permits happily of the safe withdrawal, on an emergency, of a very large disposable force for this purpose.

By means of this Railway it could be at any moment concentrated and embarked, as we have before pointed out, either from the Coromandel or the Malabar Coast as the prevailing monsoon might dictate, and brought to bear on any given point where its services were required.

But no object of greater political importance to India can be found, than the attraction of British Capital to the construction of her Railways; and the obvious course to attain it is to bring out by adequate encouragement, not such fragments of Great Lines as from their inherent disadvantages cannot be hoped to prove remunerative, but such a one as we have shown the Madras Line to be. Although, in deference to the recommendation of Mr. Simms, we have taken

£600,000 as the Capital for its construction, the several estimates which have been made by other Engineers of greater local experience, leave us no room to doubt that a Capital of £400,000 would suffice for the completing of a single Line, such as in the first instance we propose to lay down, with stations and rolling stock complete, and the estimates of traffic show very satisfactorily that on this Capital a remunerative dividend may safely be calculated on, after providing liberally for depreciation. The details of these calculations we are ready to lay before the Honorable Court, if required.

By guaranteeing the interest of five per cent. on the moderate Capital required for this Line then, it is evident that the most important ends may be attained at no real pecuniary risk to the Government. We venture to assert most confidently, that no one who investigates the question can avoid the conclusion, that the Line, whatever more it may do, will at least pay five per cent. on its construction, and to do this is to hold the guaranteeing party harmless, and at the same time to gain for it all the advantages, local and general, present and future, that we have pointed out; and that the formation of a real paying Line in India must secure.

From the absence of all engineering difficulties the Madras Line may be completed and in operation in much shorter time than those of the other Presidencies, owing to the formidable obstacles in their way. Here we have no Ghauts to tunnel and surmount, no great Rivers with shifting beds to bridge, no extensive alluvial plains subject to inundation to traverse. If all this were familiarly known to the British public, as it is to us, we should have no occasion to come to the East India Company for any guarantee, but as this unfortunately is by no means the case, and the English Capitalist, from want of local knowledge, is unable to discriminate sufficiently between one India Line and another, it is not to be expected that he will subscribe to one, which appears to be viewed with disfavour by the Government, and has been refused the guarantee accorded to the others. It must be obvious to your Honorable Court indeed, that after what has taken place no Capital can be raised in this country for making Railways

in India without the guarantee, until such time as the successful and remunerative working of one at least has demonstrated the substantive advantages of the investment. If the East India Company therefore desire to be relieved of the burden of future and heavier guarantees on this account, and to attract at the same time to Indian Railways the Capital by which alone they can be carried out to an adequate extent, they will no longer hesitate to concede to the Madras Railway that very moderate, or rather nominal, pecuniary support to which policy as well as justice appear to entitle it, and which the whole community of Madras, as well as those interested here in its welfare, now anxiously expect at their hands.

In conclusion, we shall only add that, having no personal interests to serve in the direction of the undertaking, we shall be quite satisfied if your Honorable Court will undertake the execution of the line by your own Officers, should it be considered that the public interests will be better advanced by the adoption of that course."

But while taking this step, the Home Committee are at the same time very urgent, that the public of this Presidency should give them some aid in the efforts they are making, by a demonstration of their own unabated zeal in the cause, by a resolute setting forth of their fair claims as a Presidency in the matter, and by a renewed representation of the benefit to the interests of the country which they confidently expect to see flow from the accomplishment of the undertaking. And your Committee have only to observe, in concluding this Report, that the present meeting has been more especially called together, with a view to afford to the inhabitants of Madras an opportunity of adopting such measures, as they may deem the best suited for strengthening the hands of those, who, in the object they are assiduously seeking, are addressing themselves to what must in an eminent degree promote the welfare and improvement of their own Presidency.

For the Committee,

J. OUCHTERLONY,

Honorary Secretary.

APPENDIX.

"THE MADRAS RAILWAY.

At a Meeting (*in London*) of the promoters of the Madras Railway, held on Tuesday, the 1st May, 1849,

Present,

JOHN A. ARBUTHNOT, Esq. in the Chair,

SIR JOHN CAMPBELL,
HON'BLE CAPT. HOTHAM,
J. SCOTT, Esq.

JOHN SULLIVAN, Esq.
JAMES O. WALKER, Esq.
HENRY MALTBY, Esq.

It was Resolved, That, considering the favorable modification recently made by the East India Company in the terms and conditions proposed for the introduction of railways into India, it is desirable that the Madras Railway Company be revived, with a view of securing to that Presidency a participation with the others in the advantages thus offered.

That the Company be accordingly forthwith reorganized.

That, in consideration of the expenditure incurred by the old Company in collecting plans, surveys, sections, and other information, which will now to some extent be available for this Company, it is fit that some preference should, on this account, be given to such of the old Shareholders as shall now renew their interest in the undertaking.

That a communication be accordingly entered into, through the Chairman of the old Company and of this meeting, with the view of obtaining the transfer of the Records and interests of that Company, and of arranging the terms on which its former Shareholders shall be invited to join the new Company.

That to enable the Chairman to consult with such of his former colleagues as may be within reach, and obtain their concurrence, this meeting be adjourned till Monday next, the 7th instant.

(Signed) J. A. ARBUTHNOT,
Chairman.

At a Meeting, held at No. 2 Winchester Buildings, ———
7th May, 1849, of the following gentlemen who have been directors of the late Madras Railway Company, convened by Mr. Arbuthnot,

J. A. ARBUTHNOT, Esq.		MAJOR MONTGOMERIE,
JOHN SULLIVAN, Esq.		COLONEL SIM,

It was Resolved, That, in pursuance of the power vested in the late Chairman of the Company by the shareholders at their final meeting, held on the 10th June, 1847, to make such use of the Records of the Company as might at any future time be deemed advisable by him, the gentlemen now present are of opinion, that Mr. Arbuthnot will be acting in the spirit of that resolution, by making over to the directors of the proposed new Madras Railway Company, all the books, papers, and other Records of the late Company, under stipulation that shares in the new Company shall, previous to their issue to the public, be offered to those shareholders of the old Company who paid the call of 18s., equivalent in value to double the number of shares which they held at the time of the dissolution of the Company.

It was further Resolved, That a list of the shareholders who paid the deposit only, be furnished to the directors of the new Company, with a recommendation that in the issue of shares to the public, a preference be given to applications from them to as great an extent as may be practicable.

At an adjourned Meeting held as above,

J. A. ARBUTHNOT, Esq., in the Chair,

It was resolved, That the Resolutions passed by the gentlemen representing the late Board of Directors of the Madras

Railway Company be accepted; and the following gentlemen, having signified their willingness to become directors of the new Madras Railway Company, they were appointed accordingly, viz. :

COLONEL DUNCAN SIM,

JOHN SULLIVAN, Esq.

LORD ALFRED HARVEY, M. P.,

HON'BLE CAPT. HOTHAM, R. N.

JOHN SCOTT, Esq., Chairman, East and West India Dock Compy.

ALEXANDER MACKENZIE, Esq. of the Firm of Messrs.

ARBUTHNOT AND Co.

PATRICK ROBERTSON, Esq., of the Firm of Messrs. SMALL and Co.

MAJOR J. A. MOORE,

CAPTAIN BOURNE, R. N., Director of P. and O. S. Company.

JAMES O. WALKER, Esq., late of the H. E. I. C. S.

COLONEL CANNON, Madras Army.

Auditors.

JOHN ALVES ARBUTHNOT, Esq.

SIR JOHN CAMPBELL."

MADRAS, June 16, 1849.

COLONEL SIM,

Chairman pro tem. of the Provisional Committee

for the proposed new Madras Railway Company.

DEAR SIR—By desire of the Railway Committee, appointed at a general meeting of the inhabitants of Madras, on the 29th ultimo, I have the pleasure to hand you a copy of the proceedings of the public meeting in question, and also of those of the Committee at their sittings of the 2d and 16th instant.

You will observe that our public was induced to assemble in consequence of the modification of the terms agreed to be given to certain Indian Railway Companies by the Court of Directors of the East India Company, and that they unanimously resolved to take measures for getting a Railway

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Company established for Madras under similar favorable auspices. The intelligence of the revival by yourself and your colleagues of the old Madras and Wallajahnuggur Railway Company under a new form, has induced our Committee to consider that they shall best follow out the views of the public meeting by entering into prompt and cordial co-operation with your Company.

The resolutions of Committee will best acquaint you with the views entertained on this subject and the proceedings already adopted. I should explain to you that, in the survey undertaken of a line as far as Poonamallee (which must form a section of the main line) the object is, to lay this down in a perfect manner, to estimate with elaborate care the expense of all work that falls to be executed entirely in this country, to determine the very best line that can so far be adopted—and thus, not only to give you more exact views than perhaps you already possess, of the actual cost of construction (so far as these particulars extend), as well as of the nature of this part of the country to be traversed, but also to pave the way for a more speedy commencement of the general work when once the Railway Company shall have been finally and completely established.

The Madras Committee are of opinion that it would be quite sufficient in the first instance to provide for the laying down of a *single* line of rails to Wallajahnuggur. They further think it eminently desirable in the interests of a company, that it should be sought to avail ourselves, in its requisite extent, of the services of Professional Engineers of the Madras Service, because there are peculiarities of climate and peculiarities of country, with which their local experience must render them the best fitted to grapple. They conceive also, that when the work of a railway comes fairly to be undertaken, it will be very necessary for a local board to have the supervision of its details, for it is only when this is closely exercised, and by those interested in the works' success, that the interests of the general body concerned in the undertaking can be adequately cared for.

The Committee expect that a considerable number of shares will be subscribed for in this Presidency, and they purpose sending you from time to time lists of such parties as may express their desire to take an interest in your proposed new Company.

Yours faithfully,

(Signed) J. OUCHTERLONY,

*Honorary Secretary,
Madras Railway Committee.*

LONDON, 23d August, 1849.

DEAR SIR—I have the pleasure to send you a copy of a letter under Mr. Arbuthnot's signature, which we addressed to the Court of Directors and Board of Control, on the 8th instant, in handing up copies of your communications which I hastily acknowledged last mail.

We begged at the same time Mr. Wilson, the Secretary of the Board, to be so good as see us on an early day on this matter, as Mr. Arbuthnot was about to leave town. In reply, I am sorry to say, Mr. Wilson, writing from the country, stated that he should not be in town again for some weeks, except perhaps for a day, and that it did not appear to him that any good could be done at present by another personal interview.

In answer to this note Mr. Arbuthnot wrote, on the 16th, the letter of which a copy is also enclosed, forwarding to Mr. Wilson a copy of the old Railway Pamphlet for his information. Mr. A. has since left town.

In the absence of so many of our most influential and zealous members, and of any reply from the authorities here, we have not been able to hold a board, as I was desirous of doing, to lay your communications before them. But it does not appear that anything more could have been done thereby than we have done. The President of the Board

of Control, like every one else that can, has left town, or we should have endeavoured to see him. As things stand, we can only wait now apparently for the answer to our letters, so unaccountably delayed.

I am,

Dear Sir,

Yours faithfully,

J. A. WALKER,

Acting Secretary, pro tem.

Madras Railway.

J. OUCHTERLONY, Esq.

Honorary Secretary,

Madras Railway Committee,

Madras.

COWORTH PARK,
16th August, 1849.

JAMES WILSON, Esq., M. P.

DEAR SIR—I have to thank you for your obliging communication of the 14th instant, and although it is hardly fair to address you again, while you are probably seeking some relaxation from your official duties, on the subject of our railway, I am nevertheless emboldened by the courtesy of your note to send you the accompanying short pamphlet, which contains the whole history of the Company which we are seeking to revive.

If you can afford leisure to peruse these papers you will perceive that we had taken a larger deposit from our shareholders, and proceeded further in the organization of our Company, than either of the other Indian Railway Companies. I would particularly draw your attention, for a confirmation of the latter fact, to a letter which we addressed to the Court of Directors on the 23d May, 1846, at page 53.

The largeness of our deposits, as compared with the deposits of the other Companies, was the reason which mainly induced us to recommend to our shareholders a dissolution of the Company.

The labour bestowed by the Directors in the formation of the Company, in the selection of shareholders, and more especially in their consideration and discussion of the various provisions of the deed of settlement, was I assure you very considerable, and from the positions which the majority of them had filled in the service of the East India Company, you will readily believe that they had no other object in view than the advancement of the interests of that part of India with which they had been all more or less connected.

The Madras Presidency having no water communication by means of which the produce can be brought from the interior to the ports of shipment, the establishment of railways would seem to be peculiarly desirable in that portion of our Indian empire.

I will only observe, in conclusion, that there is no part of India which is at this moment more dependent on some vigorous effort to develop its resources than the Madras Presidency. The export of manufactured cotton goods which were formerly so important, has almost entirely ceased. The growth of cotton and indigo has considerably diminished within the last two years, and the attempts which have been made at a great cost to establish sugar works have proved little less than a failure; it therefore becomes an object of importance to devise means for the encouragement of the production of exportable commodities, and so to check, if possible, the continued export of the precious metals. Within the last week a large amount of silver has been imported for the use of the East India Company from Madras. Apologizing once more for the freedom with which I have written to you,

Believe me,

Dear Sir,

Yours very faithfully,

(Signed) J. A. ARBUTHNOT.

August 10, 1849.

**THE SECRETARY TO THE HON'BLE
THE BOARD OF COMMISSIONERS
FOR THE AFFAIRS OF INDIA.**

SIR—In the absence of Colonel Sim, the Chairman of the Madras Railway Company, I have been requested by the Directors to submit for the information of your Honorable Board the accompanying copy of a letter with its enclosures which I have this day addressed to the Secretary of the East India Company.

I have the honor to be,

Sir,

Your most obedient servant,

(Signed) J. A. ARBUTHNOT.

2 WINCHESTER BUILDINGS,
LONDON, *8th August, 1849.*

**TO THE SECRETARY TO THE HON'BLE
COURT OF DIRECTORS OF THE
EAST INDIA COMPANY.**

SIR—Referring to Colonel Sim's letter of the 12th May, as acting chairman of the Madras Railway Company, I have now the honor, in the absence of that gentleman, to request that you will lay before the Court the accompanying copy of a letter from the Honorary Secretary of the Railway Committee at Madras, communicating the proceedings of a great public meeting held there under the presidency of the Right Honorable the Governor, on the 29th May last, and of the Committee appointed to carry out the object of that meeting.

The Honorable Court will perceive by these proceedings how strong and general is the feeling of the whole community of Madras in favor of this undertaking. It will also be

observed, that instead of addressing the Court themselves in a separate letter, as was at first proposed, the Committee, on learning the steps taken here, resolved to unite entirely with this Board, and to place in our hands the advocacy of their interests, as representing the people of Madras, with the authorities in this country.

Strengthened by this support, we take the liberty of expressing a hope that we may be favored with a speedy and favorable decision on the application which formed the subject of our former letter before referred to.

I have the honor to be,

Sir,

Your most obedient servant,

(Signed) J. A. ARBUTHNOT,

*For the Chairman of
Madras Railway Company.*

2 WINCHESTER BUILDINGS,
LONDON, 23d Nov. 1849.

JAMES OUCHTERLONY, Esq.

DEAR SIR—It is with much regret that I have to transmit to you copy of the unfavorable answer returned from the India House to our application, so long since made, for a guarantee for the Capital required for our Madras Railroad.

My later private letters will have so far prepared you for this official intimation of a result, that, in the early stages of our application, we could by no means have anticipated. We had every reason to be satisfied with the favorable manner in which it was received by the Hon'ble Court, and believed that the claims and merits of the line were equally recognized elsewhere. In this, it would appear, we were mistaken, but it shall still be our endeavour to procure for them that recognition.

At the meeting of the Board to-day it has been resolved accordingly to request an interview with the authorities of the India Board, with the view of removing by explanation, if possible, the objections that may exist in that quarter, or at least of ascertaining what they are. On the result the course of our future proceedings will in some degree depend.

A draft of a memorial by our colleague, Mr. Sullivan, has been considered also by the Board, and will probably form the ground work of a memorial to be signed, not only by ourselves, but by many other influential parties either connected with your Presidency, or taking, for other reasons, a lively interest in our undertaking.

The result of our interview, if we are honored with one, shall be directly communicated to you, and in the meantime your Committee may rest assured that, confident in the intrinsic merits and claims of this line on the consideration of the Indian Government, and in the known favor with which, in consequence, the Honorable Court regard it, we are by no means disposed to relax our exertions or to sit down under this repulse; but shall continue to use every effort to accomplish our common object, and to do justice to the confidence reposed in us by your Committee and the Madras community.

I need not point out how much our hands must be strengthened here by energetic measures taken on your side; we trust that public meetings, resolutions and petitions will show that you are in earnest in demanding what your Presidency has so undeniable a claim to.

I am,

Dear Sir,

Yours faithfully,

J. A. WALKER,

Acting Secretary pro tem.

Madras Railway Company.

EAST INDIA HOUSE,
2d October, 1849.

SIR—The Court of Directors of the East India Company have had under their consideration the letters addressed to me by yourself and Mr. Arbuthnot, dated the 12th and 7th May last, intimating that the original Madras Railway Company has been revived, and expressing a hope that the same encouragement which has been conceded to the East Indian and the Great Indian Peninsular Railway Companies will be extended to this Company.

In reply I am commanded to acquaint you that, pending the result of the railway experiments which are now about to be made in India, under the encouragement of the East India Company, and of the working of the system which has been adopted for their superintendence and control, the Court regret that they are precluded from granting further pecuniary support to undertakings of this nature, and that for the present, at least, they must decline to comply with the request which you have preferred on behalf of the Madras Railway Company.

I have the honor to be,

Sir,

Your most obedient humble servant,

JAMES C. MELVILL.

(True Copy.)

J. WALKER.

TO JAMES OUCHTERLONY, ESQ.

Honorary Secretary,

Madras Railway Committee.

MY DEAR SIR—I owe at least an apology to the Committee for having so long delayed to forward the plans and levels which have been prepared, for the Madras and Arcot

D

Railway ; various causes have however kept them, which (together with the expenses) were stated to you in a previous communication.

The papers now forwarded are a survey of the line to Poonamallee from the beach at Madras.

. A set of levels of the above line.

. A field book kept by the Surveyor.

. A map of the country between Madras and Arcot.

. A series of levels taken by Capt. Worster, and an estimate of the probable cost of that line by myself. } These are my own property.

I have framed no estimate of the cost of a line as far as Poonamallee, because the formation of that line, unless it were a line to terminate there, would necessarily have to be graded with reference to what the requirements of the line beyond it were. As explained to you in my note above referred to, I believe the whole of the levels might be completed for the unexpended balance in the treasurer's hands.

The great advantages of a railway need not be touched upon by me, but then these advantages demand that the means should be kept within some certain limits of expenditure.

The interior communications of this country are confessedly bad ; many of the roads have been made at a great outlay and are kept up at a great and increasing annual expense to the state, because, in consequence of their improvement, there has been a great increase of traffic, and there are no tolls or other direct sources of income for their repairs. Now the railway is not subject to this objection, for the income it derives from the carriage of goods, passengers, &c. is direct and available for its maintenance. The advantages of the rail over the common road are indisputable, and the question between the two becomes one of expense, whether the increased first outlay of the former warrants, from its superiority, its adoption.

I will not touch here upon the railways of Europe ; England, for instance, has unbounded wealth. I will, however, in

this place note the state of matters in a less powerful country, Belgium. In 1834 the Government ordered a survey of the country for the purpose of laying down railways, and by 1838, 159 miles of railway were opened, costing, every thing included, £11,000 per mile. The rails are 45lbs. to the yard; the speed averages, including stoppages, 17 miles; running speed 20 miles per hour.

The results of gradual increase of trade and traffic upon these lines are as follows—

				Locomo- tives.	Carriages for passengers.	Waggons for merchandise.
1st May	1835,	-	-	-	3	40
Do.	1836,	-	-	-	8	62
January	1839,	-	-	-	52	344
November	do.	-	-	-	82	392
						463

Now this increase of waggons shows how it is available for merchandise. The carriage for merchandise commenced only in 1838 and produced 58,594 francs; in ten months of 1839, 351,747 francs were received on merchandise.

In the face of this extraordinary increase of traffic the carriage on common roads has progressively increased (and this is a valuable fact, as goods don't run about to travel as people at first did in England), as is shown in the returns kept of the produce of the peage tolls.

In 1833, before the rails commenced,	-	-	2,360,461
1836,	-	-	2,447,985
1837,	-	-	2,584,794
1838,	-	-	2,759,548
1839,	-	-	2,749,301

Mons. Nothomb, the Belgium Minister, gives as the result of his calculations, the following comparative analysis of the advantages resulting to the public in time and money, between the mode of travelling by diligence and railway,—the mean result is a saving of $\frac{1}{3}$ in time and 33 per cent. on fares.

The saving in price is thus: subdivided by diligence or 1st class carriages 15 per cent., by open carriages 30 per cent., by waggons 60 per cent.

In Belgium, the railways are the property of the Government, which, although perhaps not always advisable, keeps expenditure both as to salaries and works within some sort of bounds.

The traffic in and out of Madras either in passengers or goods is difficult to be ascertained; it has very much increased during the last few years, and country carts, in consequence of the improvement of the roads, carry heavier burdens than heretofore, as many as 1,000lbs. being not unfrequently taken by one cart. The number of tons in and out of Madras cannot be less than 50,000; the number of travellers is also very great. Captain Worster states the number as 150,000: most of these, however, are probably too poor to pay any thing, but very many of them are not so, and travel either in hackeries or common carts. The cost of carriage is, as nearly as I can ascertain, within a fraction of two annas a ton a mile: e. g. a cart can be hired from Arcot to Madras for 3 to $3\frac{1}{2}$ rupees, $2\frac{1}{2}$ carts carry 1 ton, sometimes 2 carts do so; taking then the average cart load and hire, we have $2\frac{1}{2}$ carts, rupees $3\frac{1}{4}$ each from Madras to Arcot, or 1 ton = 7 rupees 5 annas, or 117 annas $1\frac{1}{4}$ gives 1.82 annas. The journey may occupy, when the road is in a good state, three days: return carts go generally empty. Many of these carts belong to merchants who send their goods by their servants. Many again belong to the drivers who bring down produce for sale, and, calculating the prime cost of some of the articles and the price it is sold for at Madras, it appears that the gross profit is about 100 per cent. and the net profit about 50—fifty being the price of the cost of carriage to the man who brings it; but when you come to take out of this his time, his absence from home, and consequent loss of labour, if a servant to his master or, if on his own venture, to himself, they will, I believe, soon find out the advantages of a railway and appreciate them. Again, the travellers in hackeries and palkigaries, &c. will be glad to exchange an uncomfortable and expensive mode of conveyance, being about double the expense of a common cart, for a comfortable and expeditious one if not at a greater cost; and even of the common foot passengers some few no doubt would avail themselves (were the

price made sufficiently low) of the rail to save the weariness of their journey.

In laying out the general course of the railway between Madras and Ponany or Calicut, or some other point on the Western coast in their vicinity, it appears to me that that line which confers the greatest amount of benefit on the intermediate country, will be the best; and I think that the greatest amount of benefit would be conferred by going through or within a minimum distance of the most populous places, altering the existing line of traffic in the least possible degree, and therefore such towns as Conjeveram, Raneepet, Salem, &c., should not be avoided.

The railway in question can have no opposition made to it by water carriage, and passing through or near populous towns, connecting them with each other and with rich producing districts, it appears to me, if properly and economically managed, to present a promise of success greater than other Indian lines.

From the line being only surveyed to Poonamallee, I have made no estimate of its expense, but having sometime since made an estimate of what the rail would probably cost on Captain Worster's line, I send it to you that those interested in it may see what would, I believe, be amply sufficient to construct the line in any other better direction; and I believe the line by Poonamallee, to the north of Chumbrumbaukum and Streepermatoor, joining the general direction of Captain Worster's line near Conjeveram, would be better.

You will see by this probable estimate that I have used lighter rails than those selected by Mr. Simms C. E. for the Bengal Railway, and have also allowed but one line of rail (I would have allowed bridges for a single line also, but I have allowed for a double line, as hereafter it might be considered advisable), because I believe that to be ample. Between Norwich and Great Yarmouth they have only one line of rail, and there are many lines in Germany where they have but one line. The terminus is also on the outside of Madras, and for my own part I think it should be

there; a line can be laid down the Poonamallee road from the Female Asylum, by which articles of export can be taken either by the locomotive going at one or two miles an hour, as they do through streets sometimes in America, or by horses, for I do not see the use of bringing the greater portion of the articles brought to Madras down to the sea, nor do I see the use of every thing being on a more expensive or extravagant scale than the absolute wants of the community require; and every thing but efficiency should be avoided.

Now with reference to the cost of a railway, there are two very heavy items of cost in an English railway entirely obviated here, land and law expenses. The Government offer the land, the law expenses, I imagine, need be but trifling; and with reference to the railway in question, taking Captain Worster's line, and a better might be selected, I am borne out in saying that the earth work is less than half of what is the average on English lines. An average on them gives 11 feet of cutting or embanking throughout; this of Captain Worster's, four feet of cutting and embanking throughout, with a maximum incline, and that only for a short distance, of one in 245, a most favorable comparison with many English lines, as a reference to Wishaw's Analysis will show.

The quantity of masonry will also be considerably less, and the price is here very much lower than in England—e. g., Brick-work in mortar per cubic yard—

England,
£1 - 4 - 0

Madras,
3 to 4 Rs.

Bricklayers can be procured here in any number. Their pay is included in the above rates.

Earth work must of course vary very much, from one anna a yard, up to four or five annas.

I have made no attempt at an estimate for the line as far as Poonamallee for reasons stated in para. . A reference to the plans and sections will show at once that the ground so far is favorable. For the tanks which it will destroy, one close to Madras has little water and that shallow and no culti-

vation under it; the other, near Poonamallee, is shallow,—the soil from the tank to the Wotary Nullah is black cotton soil, after that soil all the way to Poonamallee. Three or four and some 10 or 12 irrigation drains would require a bridge over the Cooum, which would cost, I

I regret that I was not permitted to have the levels completed so that an estimate might be made, but the loss is the less as the estimate Captain Worster's levels extends the whole water line can be selected, why it will probably confirm this estimate.

I believe, supposing that that line is the one in the estimate I have framed is sufficient. Any objection that may be taken from the Engineering Committee.

The inclines as noted in para. 1 are very fine for the whole, and the steepest, and that only for one in 245. A workable line might have been made with less excavation and concentrating the steepness by using an assistant engine. In some lines a second engine is used, but I do not approve of that here, as it entail heavier rails at that point, and more expense. A single engine would not be useful for other parts of the line. I believe the present inclines will be found

I believe I have very much underrated the cost of the line and traffic. I anticipate that both will increase, of which we can form no idea.

The stations will require a great deal of work to make them efficient and economical, however hot and aridness of this climate, if we confine ourselves to what is absolutely necessary, we shall be able to effect it.

I am aware that much heavier rails than those now using are used on many railroads, but it is not intended that many of the English lines have very heavy rails, varying, in many lines, between one in 100 and that heavy engines are necessary on

also a fact that as light rails as I have proposed are used on many lines; for instance, on the Dublin and Kingston 5lbs. rails, with three feet bearings; North Midland, 56lbs. rails, bearing two feet six inches; Sheffield and Rotherham, 2lbs. rails; Carlisle and Newcastle, 56lbs. rails, and three feet bearings; London and Greenwich, some 50lbs., some 8lbs; Birmingham and Gloucester, 56lbs. From this it will be seen, that with such gradients as there are in this line, 6lbs. rails with two feet six inches bearings is amply strong.

The engines are described in the estimate; they are such as were formerly used on the Manchester and Bolton line, and cost from £1,000 to £1,400.

The carriages I have given a general description of in the estimate, and averaged them at £300, which is more than they will cost, judging from the prices given in Wishaw's railways of Great Britain.

It will, I believe, be found the cheapest way for the Railway Company to do every thing themselves and to have every thing belonging to and connected with the works made on their own premises. The engines must be got from England, and the rails and the springs, wheels, and framing of the carriages also; every other thing can be constructed here, and all the foundery, carpenter, and blacksmith's work done on the premises. The earth work can be done by native contractors, having small contracts let to them in heavy excavations and embankments. The Company should be their own contractors, and when this line is completed, which could be in three years, the earth waggons, &c., would be used in extending it, and the stores, &c., purchased for this, would cheapen the extension line.

To construct this line, I would employ

An Engineer,

An Assistant and Secretary,

Two Sub-Assistants,

Two Indo-Britain Surveyors,

A Locomotive Engineer,

and a Wheelwright, accustomed to work with his own hands,

who, with the Locomotive Engineer, must come from England, as must also engine drivers. Other employès can be procured here at a cheap rate.

I should recommend the section and estimate herewith sent to be forwarded to Mr. Robert Stephenson, the Engineer who has, I believe, been already consulted on this railway, for his opinion as to the laying out of the gradients with a view to the greatest economy of working the line, the weight and bearing of the rails being confined to what they are now, and whether the engines proposed are advisable; of the buildings, management, &c., experience here will be the best guide.

The total outlay for the railway, including three years management and dividend at five per cent. which, having to be paid out of the capital, may be considered as sunk, will be 2,542,686 rupees the interest on which, with management and repairs, amounts, at five per cent., to 357,048 rupees.

The income on goods, passengers, and letters, is considered to be 354,826 rupees. This does not include troops, Government stores, or banghy parcels, or coolies carrying loads.

I believe I have made a liberal estimate for the rail and a fair calculation of the probable profit.

As the trade on the road would be, I imagine, entirely run off it and carried on the rail, the Government would be relieved from the expense of the great western as far as Arcot, and, if carried on, to Vaniembady, and they might give the present road or such parts of it, if any, as would be available for the railway, to the Railway Company as the speed contemplated is not great. By cutting off sharp bends, lowering here, and embanking there as required, much of the present road would be available which would probably greatly reduce the expenditure on bridges and earth account.

I might have forwarded estimates for rails on other constructions, for instance on the system of the London and Croydon, which is similar to the Great Western, having wrought iron rails of the parallel form weighing 42lbs. per yard, spiked down without chairs to longitudinal wooden sleep-

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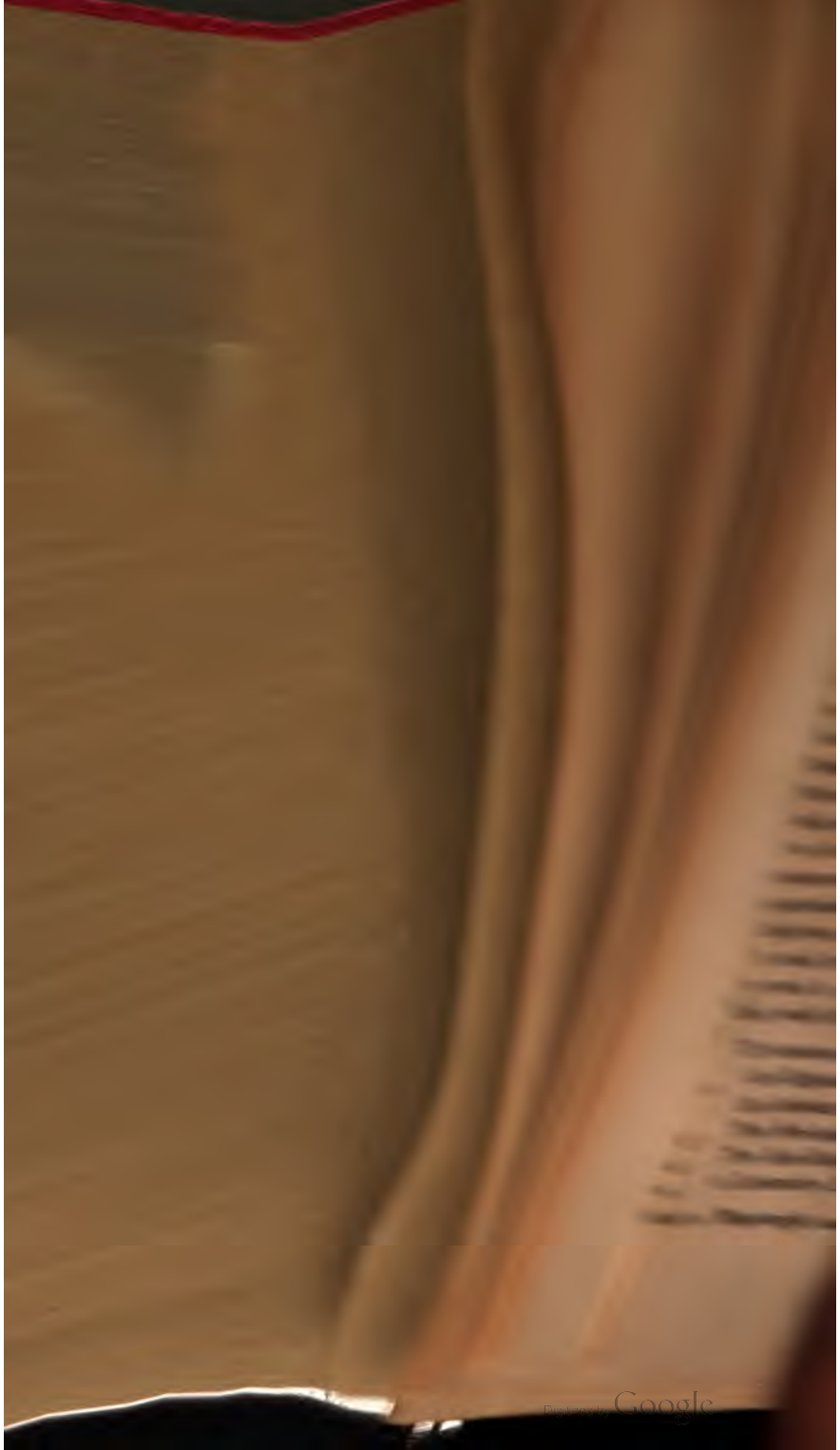
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... parols, or other camping lands.
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... probable profit.

... and would be, I imagine, entirely new
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... of the great waters on the se-
... con, is Valenciennes, and they might
... cost each pair of it, I say, is worth
... railway, is the Railway Company of the
... is not good. The cost of the railway,
... and estimated to be ...
... would be ...
... the ...



otive Engineer, must come from Engine drivers. Other employes can be at a cheap rate.

and the section and estimate herewith sent to Mr. Robert Stephenson, the Engineer, have been already consulted on this railway as to the laying out of the gradients with the greatest economy of working the line, and the wearing of the rails being confined to what is necessary whether the engines proposed are advantageous, management, &c., experience here will

say for the railway, including three years maintenance at five per cent. which, having to be paid on the capital, may be considered as sunk, will be 2,542,686 rupees, interest on which, with management and repairs, at five per cent., to 357,048 rupees.

The cost on goods, passengers, and letters, is considerable, 1,826 rupees. This does not include troops, Government stores, or banghy parcels, or coolies carrying loads.

I have made a liberal estimate for the rail and calculation of the probable profit.

Trade on the road would be, I imagine, entirely run by the Government would be reduced by the expense of the great western as far as the road, if carried on, to Vaniembady, and they might be able to present road or such parts of it, if any, as would be available for the railway, to the Railway Company as the contemplated is not greatly cutting up the sharp bends, and embankment here, and embankment as much of the present road would be saved, and probably reduce the expense of the road on account.

Other considerations
London

Western,

being 40

total work

is

ers. Again, the system of iron rails, either of the single parallel form, or plates upon wooden stringers, and on continuous stone sleepers, or Mr. Vignole's system of cast iron rails on continuous sleepers, and others, but all of which seem to be modifications of the above. With reference to the railway for which I have given a detailed estimate, the chairs might be omitted altogether, and the rails of the single parallel form spiked at once to the sleepers, as I have seen done in Germany, this would save the amount of the chairs, 2,400 rupees, and keys 264, total 2,264 rupees per mile, and a saving in maintenance of way. Again, wrought iron chairs, if chairs are considered indispensable (which they are not), might be used with a saving in annual outlay, though the original cost would be more. In the above systems, iron and maintenance of way, are, no doubt, the principal items to look to, and should guide the system to be adopted here, and this can only be determined by actual experiment.

664 X 66
5,824 Rs.

With reference to wooden sleepers, there are woods in this country, the teak, the achah, and a red wood, used in wells, for the verandahs of houses, and for pagodahs, called shemmarum, which are not eaten by white ants, and are, especially the two latter, most durable, and so hard as not to be easily worked.

The section and estimate on Captain Worster's line, herewith sent, may be retained by you and made any use of you please, and though I confess I fear we have now but little chance of a railway, still I believe the section, which is no doubt correct, should help the cause by showing what might actually be not very far from the true cost.

I am,

My dear sir,

Yours faithfully,

G. C. COLLYER, *Brevet Captain,*
Madras Engineers.

CHINGLEPUT, }
5th March, 1850. }

Probable Estimate for a single line of Railway from the Spur Tank at Madras to Wallajahnuggur, a distance of 63½ miles, as surveyed and travelled by Captain Worster.

This line commences at the Spur Tank near Madras, and, crossing the Cooum river, goes towards Nawab's Choultry through the Enam lands, crosses the cultivation below the Chumbrumbaukum tank, passes Cowoor, Coonautoor, and Shorackolotoor, ascends towards Potaphore and descends to Manumbaid; crosses the supply channel of the Erumboor tank, and the tank skirting Vergadoo and Pilipaukum, descends to the Pondoer tank and, curving, ascends the rise near Arnery; thence descends towards Chittoor, curving to avoid the Chittoor rise, thence it proceeds over the Simery tank supply channel to Rajah's Choultry; thence, crossing the high road near Yanadoor, it proceeds nearly in a direct line to great Conjeveram; curving, to avoid the town, it passes Punjipettah, the Poolary tank, the village Ambree and Moossoolwaukum, then along the Damal plains and over the ends of the Colar and Mantangle tanks to the Onloor tank; then along the bund of two small tanks at Cittady and then enters the cultivation below the Cauverypauk tank; proceeding through Ramapoorum towards Shamantangee, it extends to the foot of a hill and ends at Wallajahnuggur, near the road leading to old Arcot.

This line deviates for the purpose of taking in Conjeveram, a town of great commercial and manufacturing importance, and of great native resort, and having many dependent villages.

TRAFFIC.

The traffic on this road has been estimated as amounting, 10 years ago, to 41,000 tons of goods of all kinds in and out of Madras, and the passenger traffic to 150,000 persons annually between the termini. Since this, some 5,000 tons of sugar have been annually brought to Madras from Chittoor

and Palmanair, so that without any other increase the traffic would be 46,000 tons, which at $1\frac{1}{2}$ annas a ton a mile will give 271,687 rupees. A great increase of passenger traffic may be expected, but I will imagine that if the railway is open for 300 days during the year, there might perhaps average 60 a day or 18,000 per annum, instead of 150,000. These might be divided into 12 first class, 6 each way, 18 second class, 9 each way, and 30 third class, 15 each way, and some 4,000 at the least at Conjeveram. I suppose these passengers to average 3 rupees, the revenue from them would be $22,000 \times 3 = 66,000$ rupees. Letters cost the Government 17,139 rupees nearly, and then there is in addition to the above Troops, Treasure, Stores, Parcels, and the increase.

Revenue from goods,	-	-	-	-	271,687
Passengers,	-	-	-	-	66,000
Letters,	-	-	-	-	17,139
					<hr/>
Total					354,826
					<hr/>

Table of Inclinations commencing at Wallajahnugger.

No.	Distance.	Slope.	Ascending.	Descending.
1	3240 yards	1 in 440	"	Descending.
2	3190 do.	1 in 334	"	do.
3	3040 do.	1 in 490	"	do.
4	3290 do.	1 in 301	"	do.
5	3330 do.	1 in 586.6	"	do.
6	4539 do.	1 in 710	"	do.
7	2340 do.	1 in 301	"	do.
8	2102 do.	1 in 502.8	"	do.
9	1740 do.	1 in 377.1	"	do.
10	2260 do.	1 in 459	"	do.
11	1435 do.	1 in 1760	Ascending.	
12	1680 do.	1 in 480	"	Descending.
13	3470 do.	1 in 1200	"	do.
14	5660 do.	1 in 586.6	"	do.
15	1600 do.	1 in 406	"	do.
16	1120 do.	1 in 624.17	"	do.
17	5900 do.	1 in 1056	"	do.
18	3820 do.	1 in 480	"	do.
19	3517 do.	Level.	"	
20	2305 do.	1 in 528	Ascending.	
21	4200 do.	1 in 5380	do	
22	920 do.	1 in 406	"	Descending.
23	4090 do.	1 in 245	"	do.
24	5760 do.	1 in 528	"	do.
25	1260 do.	1 in 322	"	do.
26	3175 do.	1 in 330	"	do.
27	3250 do.	1 in 5280	Ascending.	
28	1965 do.	1 in 2640	do	
29	2110 do.	1 in 406	"	Descending.
30	1535 do.	1 in 300	"	do.
31	1350 do.	Level.		
32	2175 do.	1 in 780	"	Descending.
33	1790 do.	1 in 720	"	do.
34	1760 do.	1 in 1508.57	"	do.
35	1780 do.	1 in 1320	"	do.
36	3530 do.	1 in 1508.57	"	do.
37	3530 do.	1 in 1320	"	do.
38	7070 do.	1 in 1760	"	do.

EARTH-WORK.

The earth-work is not of a heavy description, and I have endeavoured to equalize the cuttings and embankments. By making deeper cuttings, a more level road might have been obtained, and by less cutting, a workable line might have been made, but the increase of cost in working the line becomes very great as the slopes increase.

CUTTINGS AND EMBANKMENTS.

The surface width of the embankments to be 15 feet, and the cuttings to be 18 feet within the side drains. The slopes of the cuttings and embankments must be regulated according to the nature of the soil, say $1\frac{1}{2}$ base to 1 perpendicular. (All the cuttings and embankments average 4 feet on the line in depth in England, about 11 feet on an average of all the lines.)

Lateral drains are to be formed parallel to all cuttings and embankments, 3 feet wide at top by 1 at bottom, and $1\frac{1}{2}$ deep; and a drain is to be formed at the top of the slopes of cuttings, from 2 to 3 feet wide and 1 foot deep. A rough stone drain, where stone is procurable, must also be formed in the centre of the line of cuttings, and embankments, with lateral rubble drains to the side drains. Where stone cannot be procured, tile drains must be substituted.

BRIDGES.

It is intended to have a single line of railway, in the first instance, but provision will be made for a double line, by building the bridges sufficiently wide to admit of a double line, should it be hereafter required; and as the gauge proposed is $4'-8\frac{1}{2}"$ and the intermediate space 5 feet 2 inches, and the side spaces $5'-6"$, the total width to provide for will be $25'-7"$ between the parapets of bridges. These will be built principally of brick. The number and description of bridges and culverts, said to be required, are as follows. I am, however, of opinion that, although the estimates, amounting to 46,062 rupees 10 annas, may be sufficient for the bridges and tunnels stated to be required, it will be found that not nearly sufficient allowance has been made. In English railways, as an average, 4,000 cubic yards of brick-work per mile, are used for bridges and drains. Perhaps it would be too much to assume that the half of this would be required, but still I believe that very much more than estimated for would be necessary. I have therefore tripled the estimate, and allowed 1,38,000 rupees for bridges, drains, &c.

APPROXIMATE ESTIMATES.

Bridge Account.

Number.	NAMES.	No. of Arches.	Span.	Sill or Square.	Width of way between Parapets.	Breadth of water-way.	Height under crown of Arches.	Amount.	
								Rs.	As.
1	Coovum.....	3	{ 48 50 48 }	0	24	0	13.6	15,000	0
2	Viaduct over the Nungumpau- kum Tank.....	3	{ 8 12 8 }	0	22	0	8.	1,400	0
	<i>Irrigations.</i>								
	Between Peliyoor and Corum- paukum, 5 Tunnels at an average of 50 Rupees each..		1.6	0	0	0	0	250	0
	Poroor, 3 Tunnels.....		1.6	0	0	0	0	150	0
3	" W. C. No. 1	2	3	0	0	0	3.6	175	14
4	" " No. 2	2	3	0	0	0	3.6	175	14
5	Moolypaukum W. C. No. 1	1	2	0	0	0	3.	56	8
6	Cowoor W. C. No. 1	2	2	0	0	0	4	121	8
7	" " No. 2	2	2	0	0	0	0	121	8
8	Tundalum W. C.	2	2	0	0	0	0	121	8
9	Coonator W. C.	1	3	0	0	0	6	150	0
10	Do. do.	2	2	0	0	6	0	121	8
11	" "	3	3	0	0	12	0	260	0
12	Shorakolator..	2	3	0	0	8	3	175	14
13	" "	3	{ 4 5 4 }	0	0	14	0	652	0
14	" "	2	3	0	0	8	0	175	14
	Irrigation Tunnels, 6	0	1.6	0	0	0	0	300	0
	Amarumbaid ,, 3	0	0	0	0	0	0	150	0
15	Supply Nullah near Eremboor Tank.....	3	{ 12 15 12 }	0	0	58	6 1/2	1,960	0
16	Do. To Colatoor Tank.....	1	4	0	0	5	0	145	8
17	Do. over Pillapauk Tank Flat.	6	4	0	0	Variable	4	800	0
18	Do. near Ponndoor Tank.....	1	10	0	0	0	0	582	0
	Do. Chittoor Tunnels. 4	0	1.6	0	0	0	0	200	0
19	Supply Channels of Tennary Tank.....	3	{ 20 25 20 }	0	0	50	12	2,900	0
	<i>Tinnery Irrigation.</i>								
	Tunnels at 75 Rupees each 4..	0	1.6	0	0	0	0	300	0
20	Supply Channel of Tank near Chinniah Choultry.....	3	{ 12 15 12 }	0	22	30	0	1,960	0
	Irrigation of Rajah's Choultry 5 at 50 Rupees each	0	1.6	0	0	0	0	250	0
21	Nullah Yanadoor..	3	{ 10 15 10 }	0	0	40	8	1,180	0
	Irrigation 6 at 75 Rupees each..	0	1.6	0	0	0	0	450	0
22	Viaduct over Cowery Coopum Tank.....	3	{ 12 12 12 }	0	0	0	14	1,340	0
23	" ..	1	3	0	0	0	0	95	0

Number.	NAMES.	No. of Arches.	Span.	Skew or Square.	Width of way between parapets.	Breadth of water way.	Height under crown of Arches.	Amount.
24	Viaduct Irrigation 4 at 75 Rs. each	0	1.6	0	0	0	0	300 0
	Pooterry W. C. 3 at 121½ Rs. each	2	2	0	0	0	0	364 8
25	Laulah Channel.....	3	12 15 12	Skew	0	damaged. chann.	8	1,200 0
26	Nullah from Damel Tank W. C.	1	4	0	0	0	0	150 0
	Irrigation 5 at 50 Rupees each..	0	1.6	0	0	0	0	250 0
27	Supply Channel of Damel Tank	2	5	0	0	0	4	624 0
	Oaloor Irrigation 2 at 50 Rs. each	0	1.6	0	0	10	0	100 0
28	„ Watercourses.....	2	3	0	0	0	5	245 0
29	Nullah near Carowadoo.....	2	5	0	0	10	7	420 0
30	Supply Channel of.....	2	5	0	0	12	0	420 0
	Irrigation 5 at 50 Rs. each to wards Seroogarumboor and Ramapoorum.....	0	1.6	0	0	0	0	250 0
31	Supply Channel to Wandawash.	2	3	0	0	8	0	175 14
32	Nullah at Ramappor.....	2	3	0	0	8	0	175 14
33	Channel to Cauverypauk Tank.	4	200	0	0	100	7.6	2,650 0
34	<i>Irrigation.</i> Supply Channel Shamantangee Tank.....	1	10	0	0	0	8	582 0
35	<i>Irrigation.</i> Supply Channel to Caddapantangle.....	2	3	0	0	8	0	175 14
36	Amantangle.....	2	3	0	0	0	0	175 14
	Irrigation.....	0	1.6	0	0	0	0	75 0
Contingencies at 15 per Cent.								40,054 10
Rupees...								6,008 0
								46,062 10

STATIONS AND DEPOTS.

It is intended to have a station at either terminus and at Conjeveram, for goods as well as passengers, the sheds for goods to be at Madras, say 150 feet long and 50 broad; to be built on brick pillars with teak trusses and palmirah rafters and tiles. There will be required also, at the Madras station, an engine shed, turnery carriage shed, &c., 150 feet by 50, and a booking office and waiting room, say 50 by 25. There will also be required roofing of 250 feet long by 25 wide over the rails at Madras; and an engine shed 50 feet broad in front, 100 feet broad at back and 50 feet long. At Conjeveram, there will be a shed for goods 150 × 50, and part of which can be used as a booking office; along side

of it, an arrival and departure shed 150×25 ; and an engine shed 100 feet long and 50 broad in front and 100 behind. At Wallajahnuggur, there will be required two goods sheds 150×50 , and an arrival and departure shed between, as at Madras, 150×25 , and an engine shed 100 feet long and 50 feet broad in front, and 100 behind, and a booking office in the goods shed. There will also be required, at 4 different places, sheds of 50 by 20 as stations for taking up passengers. There will also be required a foundry and casting shed which, together with a ten-horse-power engine, will cost 15,000 rupees, and 30,000 for tools for turning, tables, &c.

ESTIMATE FOR STATIONS, &c.

At Madras, 150×50 feet shed,	-	-	-	7,500
At do. 150×50 do.	-	-	-	7,500
At do. 50×25 do.	-	-	-	1,300
At do. 250×25 do.	-	-	-	6,500
One shed 150 feet broad in front, 100 ft. back, and 50 ft. long,				10,000
At Conjeveram, 150×50 feet shed,	-	-	-	7,500
At do. 150×25 do.	-	-	-	3,800
At do. 100×50 do.	-	-	-	5,000
At Wallajahnuggur, 150×50 do.	-	-	-	7,500
At do. 150×25 do.	-	-	-	3,800
At do. 100×50 feet in front and 100 behind,				10,000
At 4 different places, 50×25 each 1,300 rupees,	-	-	-	5,200
Total Rupees				75,600
Contingencies at 10 per cent.	-	-	-	7,560
For fittings,	-	-	-	30,000
Grand Total				1,13,160

ESTIMATE FOR EARTH-WORK.

15,49,254 cubic yards of cutting, at $1\frac{1}{2}$ annas per cubic yard,	1,45,242
7,19,130-15 do. of embankments, at do. do.	67,418
9,276 do. of cutting drains, at 2 annas per cubic yard,	1,159
Total Rupees	2,13,819

18 inches of ballasting give 1,956 cubic yards a mile which
 at 1 rupee a yard, gives $1,956 \times 66 =$ Rupees 1,29,096

RAILS.

I have made the estimate for rails of 56lbs. to the yard with two feet six inches bearings, with joint chains of 20lbs. and intermediate chains of 15lbs. each, to be spiked down to sleepers of country teak or other wood, 9 feet by 10, or 9 inches by 4½ or 5 inches, or blocks of stone 2' × 2' × 9" in the cuttings, if considered advisable, each spike to weigh one pound.

56lbs. Rails, 88 tons per mile, at £11-10 per ton, including freight, £1012, 1012 × 66 = £66,792, - - 667,920

	Tons.	Cwt.	qrs.	lbs.
704 Joint-chains at 20lbs. each,	6	5	2	24
3,520 Intermediate, 15lbs. each,	23	11	1	20
	<u>Tons</u>	<u>30</u>	<u>0</u>	<u>0</u>
				<u>16</u>

30 Tons at £8, including freight £240, 240 × 66 = £15,840, 1,58,400
8,448 Iron Spikes, each 1lb. 3 tons 15cwt. 1qrs. at £14 a ton,

including freight, £53, 53 × 66 = £3,498, - - 34,980

10 Water tanks 1,000 rupees each, - - 10,000

20 Sets of Crossings and Switches £15 each, £300, - 3,000

6 Turning Tables at £80 each 480

6 do. at 40 do. 240

£ 720 - - - 7,200

12 Travelling Platforms at £30 each, - - - 3,600

Total Rupees 8,85,100

WOOD.

2,112 Sleepers per mile at 3 Rs. each, including sulphurizing

on Captain Margery's principle, 6,336 × 66 = - 4,18,176

4,224 Keys at 1 anna each, 264 rupees, 264 × 66 = - 17,424

Total Rupees 4,35,600

LOCOMOTIVE STOCK.

Engines, 4 wheeled, weighing, in working trim, from 10 to 12 tons, Cylinders 12 inches, strike 18 inches, boiler, diameter 36 inches, length 7,935 feet; tubes 86 diameter, 2 wheels, 2 driving and 2 carrying, each 5 feet diameter. Eight locomotives complete, with spare fittings, each £1,400 or 14,000 Rupees, - - - Rs. 1,12,000.

CARRIAGES.

I intend the first class carriages upon this road to be made somewhat similar to second class carriages in England, except that they are to have double roofs, venetian and glass windows all round, and spring cushions, &c., but not lined with cloth as in England; some to hold 12, some 18 persons. 2d class carriages to have venetians all round, no glass windows, double roofs, seats with cushions and rail for back, to hold 33 people. It may be advisable to have part of a carriage fitted as a first and part as a second class carriage. 3d class to have roofs supported by iron stanchions, to have Macintosh curtains and benches to sit upon, with back rails, to contain from 33 to 40 people. There may also be some light trucks for those who prefer going in their palankeens, each truck to hold two palankeens.

5 First class carriages	} averaging 3,000 Rs. each,	Rs.
8 Second do.		
12 Third do.		
4 Mail do.		87,000
100 Goods waggons,	} averaging 600 Rs. each,	
5 Spring palankeen trucks,		63,000
Total Rupees		1,50,000

ESTIMATE FOR COKE.

22,000 Passengers at 11 stone each,	-	-	-	-	Tons.
46,000 tons of goods,	-	-	-	-	1,500
8 Engines, each 15 tons,	-	-	-	-	46,000
30 Carriages, each 3 tons,	-	-	-	-	120
105 Waggons and trucks, each 1.5 tons,	-	-	-	-	90
Total weight					150
					47,860

$$\frac{47860 \times 64 \times 1.75}{2240} = \frac{5360320.00}{2240} = 2,393 \text{ tons.}$$

2,393 tons of Coke require 3,542 tons of coal,	
which at 20 rupees per ton,	70,840
2 Coking ovens each 1,000 rupees,	2,000
4 Burners,	
8 Coolies, } at 64 a month,	768
73,608	

LAYING PERMANENT RAILS.		Tons.
66 miles of rails at 440 rupees a mile,	-	29,040

ANNUAL EXPENSE OF ONE ENGINE.

1 Engine driver 120 rupees a month,	-	1,440
1 Apprentice 30 do.	-	360
4 Engine men, cleaners and stokers 10 do.	-	480
Depreciation at 12 per cent. on 14,000 Rs.	-	1,680
Grease, oil, cotton, &c.	-	150
Annual repairs, smith work, and sundries,	-	250
Fire bars, &c.	-	120
		<u>4,480</u>
8 Engines,	-	35,840
Repairs of buildings, 5 per cent. on 83,160 rupees,	-	4,158
do. of carriages, 20 per cent. on 87,000 do.	-	17,400
do. waggons at, 20 per cent. on 63,000 do.	-	12,600
	Rupees	<u>34,158</u>

Maintenance of way - - - 700 \times 66 = 46,200

ABSTRACT.

Earth-work,	-	213,819
Ballasting,	-	129,096
Bridges, Drains, Tunnels, &c.,	-	138,000
Stations, &c.	-	113,160
Rails, &c.	-	885,100
Laying rails,	-	29,040
Wood account,	-	435,600
Locomotives,	-	112,000
Carriages, &c.	-	150,000
Coking ovens,	-	2,000
Sum laid out in three years for materials, &c.	-	<u>2,207,815</u>
Suppose first year,	735,938	
5 per cent.	36,796	
Management,	54,828	
Total first year,	<u>827,562</u>	
Total three years,	<u>2,482,686</u>	
Add for Foundry and fitting Instruments, &c.	Rupees 60,000	
		<u>2,542,686</u>



ANNUAL OUTLAY.

Five per cent. on 2,542,686,	-	-	-	127,134
Management 4th year, leaving out Chief Engineer and an Assistant,	-	-	-	38,028
Maintenance of way,	-	-	-	46,200
Eight Engines,	-	-	-	33,920
Repairs of buildings,	-	-	-	4,158
Carriages,	-	-	-	17,400
Waggons,	-	-	-	12,600
Coke coolies,	-	-	-	768
Coke,	-	-	-	70,840
Stationery,	-	-	-	2,000
				<u>353,048</u>

Dr.							Cr.
				To 46,000 tons of goods carried 63 miles at 1½ ans.	271,687	0	0
				Passengers,	66,000	0	0
				Letters,	17,139	0	0
To annual expense including a dividend of 5 per cent.	353,048	0	0		<u>354,826</u>	0	0
					<u>353,048</u>	0	0
				Balance to credit,	1,778	0	0

MANAGEMENT.

1 Engineer on	1,050 rupees a month,	-	-	12,600
1 do. and Secretary	700 do. do.	-	-	8,400
2 do.	350 do. do.	-	-	8,400
1 Locomotive engine	400 do. do.	-	-	4,800
1 Wheel-wright and black smith,	120 do. do.	-	-	1,440
1 Native accountant,	80 do. do.	-	-	960
2 do.	50 do. do.	-	-	1,200
3 Writers, goods dept.	30 do. do.	-	-	1,080
10 do. check givers,	25 do. do.	-	-	3,000
1 Head constable,	35 do. do.	-	-	420
4 Under do.	25 do. do.	-	-	1,200
120 Police Peons,	5 do. do.	-	-	7,200
2 Surveyors,	172 do. do.	-	-	4,128
				<u>54,828</u>



